Turning the Tide: Prospects for an Industrial Renaissance in the North Staffordshire Ceramics Industrial District

Philip. R. Tomlinson (Corresponding Author)

Institute for Policy Research and The Centre for Governance and Regulation, School of Management, University of Bath

J. Robert Branston
Institute for Policy Research and The Centre for Governance and Regulation, School of Management, University of Bath

School of Management
University of Bath
Bath
BA2 7AY
United Kingdom

Email: P.R.Tomlinson@bath.ac.uk
Tel: +44 (0)1225 383798
Fax: +44 (0)1225 386473

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Drawing upon the evolutionary geography literature, we analyse how the North Staffordshire ceramics industrial district has begun to reverse a phase of 'long decline' (1979-2008). Our analysis is based upon a series of interviews with 25 Senior Managers from within the district. We document how the district has purposively begun to exploit its traditional strengths, with firms adopting new strategies, technologies and attitudes to governance (and collaboration) in response to exogenous challenges, thus raising the prospect of an 'industrial renaissance'. The case demonstrates decline in old industrial regions is not inevitable and through 'adaptation', new trajectories are possible.

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Introduction

For many UK industrial regions, the fallout from the Global Financial Crisis of 2008 and the ensuing 'Great Recession' (2008-2013), while a significant shock, appeared to be a continuation (and in some cases, an accentuation) of their own long-term decline. This perception reflected the long-term impact of globalisation (which in most cases exacerbated de-industrialisation) and the concomitant neglect of these regions' manufacturing capabilities by successive governments (Bailey and Chapain, 2011). However, the adverse consequences of the UK's over-exposure to the financial sector (and heavy consumerism) revived the debate on a regional and industrial re-balancing of the economy, with suggestions for a greater emphasis upon sustainable manufacturing activity (Cowling and Tomlinson, 2011). There has also been some subsequent discussion about what a re-balanced economy might look like and how this could be achieved at a regional level (see Heseltine 2012).

Within this debate, a key issue is whether it is possible for older industrial regions to regain their former vitality or if decline is inevitable (as manufacturing activity shifts to lower (wage) cost locations). Drawing upon recent insights from evolutionary economic geography, this paper seeks to explore how such regions might reverse 'decline' through 'purposive adaptation' onto a new trajectory. By 'purposive adaptation', we imply this may involve a strategic and co-ordinated response by both firms and institutions in adapting to (exogenous) change and steer the region onto a different path. We do so through a detailed case study of the North Staffordshire ceramics industrial district. Industrial districts provide a useful perspective since they tend to have a long and varied history, which includes riding the vagaries of the business cycle and adapting to external 'shocks'. That many remain a thriving feature of European geography is a testament to their resilience and possibly adaptability (Pike et.al, 2010). An understanding of how such districts adapt to exogenous shocks and their evolutionary cycle might offer useful policy insights on re-balancing the economy. Indeed, Martin (2012, p.11) has recently suggested more (case) research in this area, noting '*how regional economies adapt over time and why some regions appear more successful than others, are largely un-researched issues, but such adaptation is arguably a key source of economic resilience*'.

This paper adopts an evolutionary approach in exploring how the UK's North Staffordshire ceramics industrial district has recently begun to move from a phase of 'long-term decline'

(1979-2008). The ceramics district is of interest, not only because of its long history (dating to the seventeenth century) and 'romantic notions' of being one of the UK's last 'industrial districts', but also because it exhibits some resilient characteristics and adaptive capabilities many economic geographers view as being critical for the future development of similar European districts (Pike et.al, 2010). This has raised the possibility of an 'industrial renaissance' and a 're-emerging Marshallian industrial district' (Bellandi, 2011). Our research documents and analyses the district's recent 'adaptation' through a series of interviews with Senior Managers from across the district.

The remainder of this paper is set out as follows. We begin by reviewing the recent literature on cluster evolution, before identifying some of the key mechanisms to facilitate renewal in old industrial districts. The next section introduces the case and the research approach, before presenting the main results. The following section provides some wider reflection and discussion. Finally, we conclude.

Cluster Life Cycles and Industrial Renaissance

Cluster and Adaptive Life Cycles

In exploring future trajectories and prospects for old industrial districts, it is appropriate to begin with the notion of district (or cluster) evolution. Recent work in this area has emphasised the long lasting impact(s) of exogenous shocks (such as recessions) and/or endogenous (structural or organisational) change(s) upon district (cluster) trajectories (see, Martin, 2010, 2012)[1]. Thus district (cluster) trajectories are often regarded as the product of their own history and past experiences, i.e. they are path-dependent (Martin and Sunley, 2006). It is within this context researchers have begun to identify particular phases within cluster development and explore the generic characteristics behind these evolutionary paths. A prominent framework is the life cycle model in which a district is envisaged to progress through four stages: initial development; growth and expansion; maturity; and decline or transition (Van Klink and De Langen, 2001).

Recently, Menzel and Fornahl (2010) proposed the key driver within this cycle as the changing degree of technological heterogeneity among clustered firms. They argue during the early stages of the life cycle there is generally wide heterogeneity through entry with firms (arising via spin-offs from (larger) firms in related industries and/or public research centres) competing over alternative (technological) concepts. In the growth and expansion stage,

heterogeneity falls as leading firms reduce their uncertainties by adopting the 'dominant design' (or technology) and there is a 'shake out' of inferior technologies (and firms). The district subsequently follows a narrower technological path, yet while specialisation facilitates synergies and agglomeration economies between firms, a paradox arises as the reduction in heterogeneity raises the possibility of negative 'lock in' effects in later stages of the cycle (Hill et.al, 2008). Indeed during the mature phase, district competitive advantages may dissipate due to congestion costs and knowledge codification, while the narrow focus (and over-reliance) upon existing technologies increases inertia and reduces the probability of radical innovations (Tichy, 2001). Consequently, while geographic concentration falls with some firms relocating (on efficiency grounds) outside the district, industrial concentration (within the district) rises due to consolidation as weaker firms fail and/or are taken over by larger rivals (Swann et.al, 1998). This leaves too little heterogeneity within the district to spur the generation of new ideas; a mono-structure emerges exacerbating decline (Jacobs, 1969).

This scenario is often associated with many old (and struggling) industrial districts, 'locked in' to past specialisms and exhibiting a lack of dynamism, with slow adaptation to change (Pike et.al, 2010). However, Menzel and Fornahl (2010) identify the possibility for such districts to either renew along their existing path (i.e. oscillate between stages (of the life cycle)) or transform themselves into different fields. The pre-requisite is an increase in the degree of heterogeneity and for renewal this might be achieved through exploiting the 'related variety' of sectors (and technologies). 'Related variety' is where (district) firms have the capabilities (and absorptive capacities) and strategic foresight to un-lock the district's existing expertise, competencies, and knowledge bases and combine these with new, complementary ideas and technologies in adjacent (and related) sectors (see Frenken et.al, 2007). The fusion of past specialisms and modern technologies may in turn facilitate spill-overs, thus encouraging new entry (of firms), widening economic diversity and opening up the possibility of extending the district's life cycle. Over time, this process may also lead the district to diversify into completely new sectors (Boschma and Frenken, 2011)[2]. The second (less likely) option is a transition onto a very different trajectory (i.e. in new unrelated fields) through '*integrating completely new actors (and technologies)*' (Menzel and Fornhal, 2010, p.228).

Martin and Sunley (2011) raise concerns about the overly deterministic and definitive (and ageing) nature of life cycle approaches, arguing that many clusters evolve in very different

ways based upon the nature of technological fields, organisational forms, and historical contingencies. For Martin (2010), the notion of (negative) 'lock in' is especially problematic since it emphasises a static equilibrium arising within districts replicating previous technologies and '*what is already there'* (p.9) as opposed to evolutionary change[3]. Instead, Martin and Sunley (2007, 2011) view clusters (and districts) as 'complex adaptive systems', where evolution does not follow a specific path but is rather an 'adaptive cycle' based upon path dependencies and ongoing interactions (and feedback loops) between actors within and also outside the district's (recognised) boundaries. Thus the impacts of both exogenous factors and organic, endogenous change can influence adaptation, technology transformations, and (product) novelties arising within heterogeneous clusters (or districts) at different speeds and in very different time-horizons. Consequently, the degree of technological heterogeneity is likely to vary across districts (and is not phase dependent) opening up the possibility of multiple trajectories which are not (real) time specific (Martin and Sunley, 2011; Pike et.al. 2010). The prospects for mature (and declining) districts therefore depend upon their own *adaptive capacity* to reconfigure internal structures and instigate the necessary changes in adapting to new (and very different) market and technological challenges; this is essentially a measure of their resilience (Graber and Stark, 1997; Simmie and Martin, 2010; Martin, 2012).

Reviving Old Industrial Districts: Strategy, Governance and Collaboration

Within both evolutionary approaches there is, however, a congruent acceptance that exploiting 'related variety' and widening heterogeneity are important catalysts for the revival of mature (and declining) industrial districts. In this regard, an *actor perspective* is particularly useful in exploring a district's future development path (Boschma and Fornahl, 2011). Porter (2000), for instance, has long emphasised the strategic role (and management) of firms in 'cluster upgrading'. He argues successful 'cluster upgrading' requires firm level strategies that are geared towards investment in new technologies and skills, combined with wider (inter and intra) sectoral collaboration and closer liaison with institutions to support local investments in public R&D facilities and wider infrastructure (*ibid.* 2000, p.27-29). Such strategies provide firms with greater capacity and a wider set of cross-sectoral opportunities to exploit 'related variety', while also (potentially) widening technological heterogeneity (within the district).

In addition, a district's revival is also enhanced by district firms strategically shifting their attention to higher value added activities (such as design, innovation, and possibly 'niche' markets) so as to avoid low cost (global) competition. For instance, Sammarra and Belussi (2006) compare how Italian firms in both the Vibrata-Tordino-Vomano (VTV) clothing and Montebelluna sportswear districts have responded to global competition since the early 1990s. In VTV, the majority of firms eschewed upgrading the quality of their products and instead engaged in a damaging price competitive strategy. This resulted in low profit margins and a high mortality rate of firms (and employment), which has left the (VTV) district increasingly exposed to (global) low cost competition and 'locked into' a low development trajectory. In contrast, in Montebelluna firms successfully engaged in a selective process of relocation (to Eastern Europe) substituting outplaced (low cost) activities with more valued ones. The authors conclude *'while the original district has lost the more standardised 'tail' of the manufacturing process, it has kept well alive…the most valuable and creative phases of sportswear filière'* (*ibid*, 553-554). Such strategic refocusing (by firms) can help set a district onto a high(er) road of development (see Pyke and Sengenberger, 1992).

An adjunct to renewal is the nature of economic governance and network relations within the district (see Parrilli and Sacchetti, 2008). The enduring (but now largely forgotten) feature behind the vitality and renewal of the Italian industrial districts were their relatively diffuse governance structures, which facilitated inter-firm collaboration, collective actions, and engineered a dynamic climate of co-opetition (Brusco, 1982; Piore and Sabel, 1984; Beccattini, 1990). These (mature) districts embodied numerous criss-crossing 'heterarchical' relations consisting of local firms and actors, which were often described as 'reciprocal', 'flexible' and involved 'joint actions' in productive activities (such as the co-sharing of information and technology)[4]. Local institutions such as trade associations and municipal governments were often the conduits for promoting these types of dyad, and crucially, also in reinvigorating old(er) networks with new partners to prevent them from becoming staid and over-embedded (see Bellandi, 2011). More generally, the ability of (local) actors to engage with each other and (local) institutions (and (if necessary) instigate changes within these bodies) over issues of mutual concern and collective actions, can be important for the district in meeting new challenges (Boschma and Frenken, 2009; MacKinnon et.al, 2009)[5].

Finally, it is apparent the more resilient districts are those that can attract new firms, develop new skillsets, and adapt and embrace new heterogeneous technologies (Pike et.al, 2010). Along with our preceding observations, this may point towards a role for a regional (and

industrial) strategy in providing support for firms and collaborative activities and more generally, steering mature and declining districts onto new trajectories (Bellandi, 2011; Bailey and Chapain, 2011). Policy intervention though requires care and diplomacy particularly where there are political pressures to retain past structures (within the district) that can re-enforce negative 'lock in' effects and may be ultimately ineffective. Moreover, the efficacy of policies will depend upon the appropriateness of policy measures applied at specific stages of the district's trajectory. For mature districts, Brenner and Schlump's (2011) recent algorithms exploring the effectiveness of cluster policy (at different phases in the life cycle) suggests some scope for policy intervention to avert decline. They advocate new investment in technological gatekeepers such as public research institutes, greater support for private R&D to encourage adoption of new technologies and critically, the renewal of district networks to overcome problems of over-embeddedness and 'lock-in'.

Summary

To summarise, the prospects for renewal within mature and declining industrial districts are based upon firms strategically (re-)focusing upon high(er) value added activities and possibly exploiting 'related variety', while at a district level, it includes widening technological heterogeneity, more diffuse governance structures, and re-invigorated (collaborative) networks. This will involve adaptation by actors, such as firms and institutions (within the district), to (exogenous) changes in (global) markets (Menzel and Fornhal, 2010; Martin and Sunley, 2011). In doing so, adaptation is likely to involve greater collective action over issues of mutual concern. These issues are now explored further in the context of the North Staffordshire Ceramics industrial district.

Case Study: Turning the Tide in the North Staffordshire Ceramics district

Background

Home to one of the oldest and last remaining UK industrial districts, the city of Stoke-on-Trent (in North Staffordshire) is synonymous with the production of ceramics. At least 1500 different pottery firms have operated within the district since its genesis in the seventeenth century [6]. The district has not surprisingly been labelled 'mature', with ceramics shaping the region's industrial landscape and social fabric while providing long-standing employment (Whipp, 1990). The city retains its industrial identity as the centre of UK ceramics activity with productive activity occurring across the industry spectrum; table and giftware (the most

prominent sector) and to a lesser degree, tiles and flag manufacture, technical and refractory ceramics, brick and roof tile manufacture, and sanitary-ware. The district also retains capacity in material and equipment supplies including clays, glazes, ceramic decals and (reduced capacity) in kilns and other machinery manufacture. Finally, the industry's main trade associations, ceramic research centres, and labour union are also located within the district[7].

Recent studies have focused upon the challenges posed by structural and (related) governance changes occurring within the industry and, in particular, the impact of globalisation upon the district's trajectory (Day et.al 2000; Carroll et.al, 2002; Sacchetti and Tomlinson, 2006, 2009; Hervas Oliver et.al, 2011). These studies have tended to portray a somewhat 'pessimistic' picture, as the district has struggled to deal with these challenges. The stylised facts are following the recession of the early 1980s, the district witnessed the closure of several high profile factories (and firms) and moves by some manufacturers (during the 1990s) to 'global outsourcing' of production to take advantage of lower labour costs and remain price competitive. The decline in domestic capacity led to a subsequent deterioration in the UK ceramics trade balance, with the industry's long running trade surplus ending in 2003 and an annual deficit being recorded in every year since. By 2011, this deficit reached £703 million, although this has fallen back to £654 million in 2013, largely due to improving UK exports (UK Trade Info, 2014). Concomitantly, ceramics employment in the district has officially fallen from 52,700 in 1979 to 7,200 in 2008, although district sources suggest a marginally higher (current) workforce of around 10,000 (the official data doesn't capture some sub-contracting activities (and employment) related to the ceramics industry). Nevertheless, the district has lost a significant number of jobs (and skills) over the years, although notably employment levels since 2008 have remained relatively stable (The Work Foundation, 2008; Office of National Statistics, 2013)[8]. Finally, historical data on the evolving population of firms within the district is not available; although it is widely noted significantly fewer exist than in the industry's 'hay day'. Current industry estimates suggest 282 ceramics firms were operating within the district in September 2013. In 'life cycle' terms, we might classify the period 1979-2008 as the phase of the district's 'long decline'. At both the industry and regional level, several reports were commissioned in response and to explore positive 'ways forward'. The subsequent recommendations focused upon investment in new technology, improving training and skills, and critically a new approach to governance facilitating greater networking and co-ordinated marketing within the district (e.g. ECOTEC 1999; Staffordshire

Business School, 2000; North Staffordshire Taskforce, 2003; Ceramic Innovations, 2003; SQW Consulting, 2009; The Work Foundation, 2008).

Empirical Design

The current study builds upon our previous knowledge and research into the North Staffordshire ceramics district, and is part of a wider research programme exploring governance, networking, and the role of institutions within UK industrial districts. The data analysed in this paper relates to a set of 25 semi-structured interviews conducted with Senior Managers of several ceramics firms based in the district and high level representatives from the BCC, CERAM, ICTa, the North Staffordshire Chamber of Commerce, and the Economic Development Office of Stoke on Trent City Council between July and September 2013. The firms had indicated a willingness to be interviewed (on an earlier returned questionnaire) and were chosen from across the whole industry spectrum. The institutions provided a more meso-perspective (i.e. at the district level). The breadth of companies and institutions interviewed ensures the data broadly reflects wider perspectives within the district (see Bryman, 1988). The interviews were held at the interviewee's premises, with each lasting for approximately one hour, and were based upon the generic theme of firm and district-wide responses to the phase of the 'long decline' (and the recent 'Great Recession'), drawing upon the theoretical issues identified in our literature review. Each interview was conducted by both researchers and was (digitally) audio-recorded before being transcribed using a professional transcription service. Both interviewers were aware of the danger of response bias in interviews and followed procedures to avoid such potential biases in the questioning techniques employed, so as to ensure reliability and validity in the data collection (see Saunders et.al, 2003, Easterby-Smith et.al, 2002, Yin, 2014). The anonymity of interviewees was assured to protect commercial sensitivities.

Data Analysis

The data was checked and coded by both researchers, before being used for thematic analysis. This involved identifying, examining and recording patterns (or themes) within the data, with the process being guided by theory. The themes were then organised into categories (sub-themes) and from this several constructs were identified (see Eisenhardt, 1989; Saldana, 2009; Yin, 2014)). We first structured the interview data around four prominent categories:

the impact of exogenous factors; firm management and strategy; changing technological capabilities; and district economic governance, networks and collaboration. These categories should not be considered in isolation, but as part of a broader story where issues interact and build upon one another to provide an overall picture. Our suggestion is it is the coalescence of various factors which explain the observed district trajectory, and that the role of a single construct in the district's development should be considered within this wider context. Where appropriate, we supplemented the interview data with reported information from published sources (including local and national media reports), to substantiate (and validate) the analysis (being careful not to break the confidentiality of the interviewees). Throughout, the analytical approach was to examine the data and identify patterns that matched theory in the context of district trajectories at the mature and declining phase of the cycle[9]. In doing so, we sought to specifically explore the adaptation strategies of actors so as to understand the district's trajectory (Boschma and Fornahl, 2011; Martin and Sunley, 2011).

Interview Data: Insights

Exogenous change (and Shifting Tides)

As noted above, global outsourcing to the Far East by some of North Staffordshire's leading firms became synonymous during the phase of the 'long decline'. Recently there have been signs the *'tide has begun to turn'*, with the district regaining some its' competitive edge not only on reputation for product quality, but also over narrowing global cost differentials. Consequently, the district has begun to benefit from re-shoring as some firms, including Waterford Wedgwood Royal Doulton (WWRD), have returned some production from the Far East (see also Bailey and De Propis, 2014).

There are several exogenous factors behind this *shifting tide*. First, there is the nature of global demand and wider recognition of the (historical) reputation of the quality of products designed and manufactured within the district(particularly premium wares) holding cache among more discerning (and aspirational) consumers. This is particularly the case in the traditional export markets of North America and Japan where consumers are (generally) averse to purchasing expensive wares manufactured in the Far East (especially China) but sold under one of the district's branded names. For instance, it was widely observed Royal Doulton's demise as an independent company was partially due to the outsourcing of its

product ranges to Indonesia, tainting its image and resulting in lost market share in the critical North American market. There was also widespread agreement the quality of wares manufactured within the district was still amongst the best in the world and while wares sourced from the Far East were improving, they were still of an inferior quality (and critically, so was the perception of these [Far East] wares). One (Tableware) Managing Director noted [of wares sourced in the Far East], *'they often look the same and they sometimes feel the same [as Staffordshire wares], but they're not the same'.* The 'Made in England (and/or Staffordshire)' back-stamp has therefore, for many district firms, become an increasingly important differentiator and marketing tool.

Secondly, there are cost factors, with rising labour and energy costs in the Far East where resource constraints have begun to bind. The lower UK foreign exchange rate and EU imposed anti-dumping duties on Chinese products have also helped to reduce cost differentials. These narrowing cost differentials have been a significant factor behind recent re-shoring activities, particularly in the Table and Giftware sector. As one Managing Director put it '*We are increasingly finding we can make products here [in the UK] cheaper than we can manufacture them in China"* while another wryly noted *'costs and prices [in China] are going up….which makes it a less attractive place to manufacture'.* Moreover, a number of district firms also revealed long-standing logistical problems and rising transaction costs, encountered in global outsourcing. These included time lags in placing orders (with factories and sub-contractors) in the Far East and ensuring the reliable delivery of (finished) products to suit Western retailers. Some firms also raised concerns Far Eastern suppliers were acting opportunistically in response to (rising) costs by either reducing the quality of the products delivered and/or switching to inferior packaging. To negate these issues, some firms had incurred additional (governance) costs by employing a trusted overseas operative to supervise production.

Firm Management and Strategy

In response to these exogenous factors, the more successful district firms had begun to adapt and upgrade their product focus into higher value added wares, and also pay more attention to their designs (and design teams) and wider marketing activities. This has enabled them to carve out specific market niches and avoid cut-throat (low cost) competition. Notable examples include Emma Bridgewater and at the very high end, Moorcroft, whose wares are largely marketed upon their unique designs and being hand-crafted within Stoke on Trent[10].

While some leading district firms have always pursued this strategy, there was also evidence new entrants were adopting a similar outlook. Many had recognised the low end of the market was largely occupied by (Far East) competition and opportunities for a viable return were negligible. Instead, these new entrants – many of which were micro firms - focused upon developing novel (and sometimes quirky) products to suit particular market niches. One firm, for example, focused upon using unique watercolour illustrations on their animal and wildlife (giftware) ranges, along with offering a bespoke personalisation service. Another firm had developed a niche based upon using their own contemporary English (and occasionally punk and unconventional) art illustrations on their wares, which had gained domestic and international appeal (particularly in Japan). Both firms emphasised the design (and designer) of their product(s) and commanded premium prices.

Similar upgrading strategies were also being pursued in the supply chain. For instance, a leading decals firm had deliberately moved from producing low to medium range print decals (which had become susceptible to Far East competition) to focus exclusively upon the high end of the market. This involved investing in improved print capabilities and design sophistication, building upon existing skills and techniques within the company and the wider district. The firm succeeded in producing a high quality and more complex set of decals that were difficult to imitate and which appealed to high value clients. They have also begun to exploit these new techniques in related sectors including glass, fine art reproduction, and high end photographic posters. These sectors now account for approximately one third of the company's turnover, and the overall strategy has not only shielded it from low cost competitors, but allowed it to thrive in the global market.

It was also noted the district had begun to employ more professional managers, often from outside the district, with prior experience of management in wider manufacturing, finance, services, and the public sector. There was a strong view there had previously been a degree of 'nepotism' in managerial appointments (particularly in family owned firms) which had re-enforced (existing) rigid practices and 'closed ideas' within the district. It was widely acknowledged the new appointments had been accompanied by some significant changes in managerial practice, attitudes, and leadership within firms, particularly relating to marketing, technology, and networking, and these had had, in a recent years, a positive impact across the district more widely.

Indeed, there was a consensus the managerial changes had been important in facilitating a shift in the strategies of some district firms from being 'production-led' (developing (mass) products with little engagement with consumers) to being more focused (and acute) in responding to consumer requirements than in the past. This has involved closer liaison with retailers and distributors, and tailoring products for particular markets. Some firms have also diversified their product range so as to reduce their reliance upon traditional products. This varies across the district with, in table and gift-ware for instance, some firms selling related (cookery/dining) products, while elsewhere in the supply chain, firms are exploiting 'related variety' by moving into new ceramic or art related products and/or wider material transformation applications.

Changing technological capabilities

In a sign of rising confidence, there have been some well documented recent (and announcements of future) investments in new technology and facilities within the district, largely by leading firms seeking to exploit the changing global market. The most notable include Wade (a giftware manufacturer), who have invested in both newer plant (doubling their production capacity) and specialised equipment to remain competitive on both quality and costs relative to lower wage (labour intensive) competitors in the Far East. Wade have also announced plans for an additional facility – adjacent to the existing (new) factory - which is to be partly funded through the government's Regional Growth Fund (see *Staffordshire Sentinel*, 11/7/2013). In hotel-ware, Steelite International has announced plans to build an additional facility (and install new technology) on a brown-field site within the district, while WWRD are also investing in a new plant at their Barlaston site (see *Progressive Gifts & Home Worldwide*, 2013). Finally, Ibstock Brick have invested significantly in a new factory, which includes a new tunnel kiln, in nearby Newcastle-Under-Lyme.

The extent of new investment varies across the district although the embracement of new technologies is not universal even in successful firms (particularly where traditional crafts are valued)[11]. However, it was noted a number of firms have begun to invest on a lesser scale in, for instance, smaller quick firing kilns, new high tech robotics and, along the supply chain, new print and decal technologies. These investments should allow firms to maintain quality while being more flexible in production; they reflect an industry which has gradually emerged from being predominantly 'production led' to one more focused on customising

products to particular markets. In other cases, some manufacturers were reported to be reconditioning existing equipment ('out of mothballs') to meet rising demand. Across the industry, the new investments have led to significant improvements in quality and efficiency. Historically, the industry tolerated first time defect levels of 50%, which were sold (largely locally) as 'seconds' or recycled; it was noted that defect levels are now considerably lower.

Specialised ceramic equipment used to be designed and manufactured largely within the district. During the 'long decline' this sector also suffered, and while some local manufacturers remain, local capabilities in the machine industry have significantly diminished. As the district recovers and possibly evolves in different directions, there is unlikely to be a concomitant rise in the machine sector. Comparative advantage has now shifted to Germany and Italy, where most modern ceramic equipment is now manufactured. However, reliance upon foreign technologies is no longer perceived as a Trojan Horse and indeed can foster fruitful cross-national relations, synergies and innovation (see Hervas Oliver and Boix-Domenech (2013) on the cross-links between the ceramic tile and machinery districts of Sassoulo and Castillon and the wider (global) value chain in the ceramics industry)[12]. For instance, Ceram - the industry's main Research and Testing body – has recently worked closely with an Italian manufacturer on the design of a special prototype kiln, as part of a project to develop a low energy solution for firing ceramic wares[13].

Ceram is the district's main technological gatekeeper and has a long history in enhancing innovation within the ceramics history (Warren et.al, 2000). It is funded largely through contract work and its functions are geared towards testing materials, products and processes, along with some primary research mainly related to energy efficiency. Ceram acts a conduit not only to the ceramics industry but also in recent years to other (often related) industries, which has opened up the possibility of cross-fertilisation (of ideas and technology) within the district[14]. These largely relate to materials transformation where through geo-polymerisation, ceramic technologies can be effectively (and efficiently) utilised in anything from bio-inserts and bone transplants, to drug delivery systems or mobile transmitters. It was noted some firms were already exploiting synergies between these new and old technologies ('related variety') and if these continue, it is anticipated that up to 20,000 new jobs may be created within the next decade; the majority within the district and its vicinity. In anticipation of such developments, Ceram are currently part of a joint funding bid – under the City Deal scheme – for a proposed Applied Materials Research and Innovation Centre, supported by the Massachusetts Institute for Technology, Imperial College London, and the University of

Cambridge. Finally, the district is also served by the Longton 'Hothouse', a facility providing firms – for a small fee – access to the latest computer-aided design (CAD) and computer aided manufacturing (CAM) tools. This allows firms to bring new designs to market more quickly, without incurring the high sunk costs associated with undertaking specific investments in such technologies.

Economic Governance, Networking, and Collective Action

Previous consultancy reports have been somewhat critical of governance within the North Staffordshire district, highlighting a lack of inter-firm co-operation, in particular, as a barrier to growth. This has led to several proposals for better governance structures, facilitating greater collaboration (and social capital) among district firms, institutions and related stakeholders as a means to revive the district (e.g. North Staffordshire Taskforce, 2003; SQW Consulting, 2009)[15].

There has, however, always been a degree of co-operation within the district. The most formal example is Furlong Mills, a key supplier of raw materials and minerals for the industry, which since the early 1980s, has been co-owned by Portmeiron, Churchill China, and Dudson – the latter two companies being close competitors in hotel-ware. While these shareholders act as custodians of one of the industry's main supply lines, the company itself operates as an independent entity and supplies other firms in a non-discriminatory way. Other co-operative ties have tended to be on an ad-hoc basis and are largely informal. Historically, these have included some capacity constrained firms outsourcing work within the district while other firms have temporarily shared workforces and in some cases machinery, during peak-times (Carroll et.al, 2002). Outsourcing within the district is not without difficulty, as moulds, clay bodies and recipes differ between firms which in the latter case, raises risks of contamination (between clays). Moreover, while outsourcing (within the district) still occurs, it is on a lesser scale than in the past. This is partly due to the district's reduced capacity, but also the greater technological diversity of firms (who often utilise dissimilar skillsets), making it difficult to match suitable partners for collaboration. This may act as a constraint upon growth within the district, particularly if it inhibits the potential for young, smaller firms (who are unable/unwilling to invest in additional capacity) to grow. Indeed, our own research revealed several smaller firms (seeking to outsource within the district) faced problems of opportunism, particularly relating to maintaining quality, delivery schedules, and in one case, a loss of proprietary knowledge.

Nevertheless, across the district there was a genuine feeling that while old rivalries (and suspicions) may remain, firms were becoming more open towards collaboration and willing to engage with each other than during the phase of the 'long decline'. In this regard, the North Staffordshire Chamber of Commerce has begun to play an increasingly prominent role in linking businesses, and generally facilitating greater networking among firms within (and outside) the district. On the production side, there has also been a greater use of benchmarking (over products and processes) between firms, along with cross-factory visits and informal conversations between managers, thus enhancing knowledge sharing and cross-fertilisation of ideas across the district. In the supply chain particularly, whether in decals, glazes, surface decoration or clay bodies, there has also been notable increase in collaboration between partners to ensure high quality and consistency of the final product (Tomlinson & Jackson, 2013). Finally, some of the leading firms have begun to provide (informal) advice and support to smaller district firms, with Steelite, for instance, outlining plans for an incubator unit for 6 start-up ceramics firms at their new factory.

Most of this new collaboration has been upon issues of mutual interest and is largely co-ordinated through the district's various institutions. Indeed, there is now a *closer liaison* existing between the different institutions over industry issues and in supporting the industry's overall development. This is partly due to the City Council Economic Development Office, which was instrumental in helping to establish (in 2010) the Ceramic Development Group (CDG), a collective body of stakeholders from the main local institutions (the BCC, the NSCC, Ceram, and Staffordshire University) and manufacturers (both large and small) from across the district. The CDG meets regularly, and acts as a focal point for a wider discussion of industry issues and future challenges. Recent example include formulating industry responses to EU and/or government policy directives, co-ordinating joint funding bids for new projects funding, and promoting the district and industry. Indeed, attitudes towards external funding have become more collaborative. Previously it was noted there was a general lack of interest (among firms) in applying for external funds largely directed at regional (rather than firm specific) projects. However, the district's institutions have become more adept conduits in co-ordinating proposals increasingly viewed as being widely beneficial for the district (e.g. Ceram; see below). Finally, 'Concept Collective' is a new hub for Staffordshire based ceramics designers and artists to share ideas and initiatives for creativity within the district.

Co-ordinating collective action for industrial development presents its own difficulties, notably in aligning the different (and sometimes conflicting) interests of the various participants (Tomlinson, 2012). The district has though – in a short space of time - been effective in co-ordinating several notable collective activities. These include addressing the 'hollowing out' of the skills base; a consequence of the 'long decline', as jobs and skills were lost and ceramics related courses (particularly technical ceramics) at local colleges and universities were gradually withdrawn. The CDG, the BCC, the NSCC, and several leading firms have recently secured – on behalf of the industry - government funding for a new Ceramics Skills Academy to train future workers within the industry[16]. Another key issue has been energy costs and climate change levies. As previously noted, Ceram has promoted joint collaboration in seeking more efficient firing methods. With regards to climate levies, firms have worked closely with the BCC in seeking exemptions for the industry at both a national and European level (BBC news, 20/3/13). Recently, district firms, the City Council, and the BCC have jointly begun to explore possibilities for extracting local coal bed methane gas in order to generate power for the ceramics industry and local households (The Sentinel, 28/8/2013). This may provide the district with a degree of self-sufficiency in energy supply, while also attracting new investment from the energy sector into the district.

Within the tableware sector, there has been significant collaboration among firms, the NSCC and the City Council in designing a legally recognised and authenticated back-stamp indicating a product has been produced wholly in England (and by implication, within the district). The back-stamp is an important marketing tool in global markets, but previously its use has caused controversy with some firms outsourcing wares overseas and then pursuing a variety of strategies to disguise or downplay the (partially) imported nature of these wares (including applying a UK back-stamp) to steal a competitive (cost) advantage. The new back-stamp can only be applied to products being wholly produced in England and validated by the independent Ceramic Industry Verification Service. The intention is to create a legally enforceable means of marketing domestically produced wares in a similar way that a 'Red Tractor' kite-mark highlights UK produced agricultural products.

In terms of wider marketing of the district, the City Council and the industry are collectively involved in the organisation and sponsorship of the British Ceramics Biennial. This initiative began in 2009, and is a six week festival of UK ceramic art, which provides an international showcase for the district and its' manufacturers[17]. Finally at a pan-European level, the City

Council and industry representatives (from the district), have actively been involved in an EU funded project (2008-2011), the Urban Network for Innovation in Ceramic Cities (UNIC). This network of nine European (ceramics focused) cities brought together ceramics industrialists, policymakers, and other stakeholders from across Europe in a series of workshops and exchange visits to share ideas and discuss policy initiatives to revitalise and promote growth within these cities. Although, this EU funding has now ended, the links between these localities still continue[18].

Reflection and Wider Discussion

The recent strategies and initiatives adapted in North Staffordshire resemble many of those advocated in the recent literature as being suitable for rejuvenating mature industrial districts. However, while the early signs are promising of a re-emerging Marshallian industrial district within North Staffordshire, it is too early for a full evaluation of the impact of such initiatives. This requires a longer time-frame. Nevertheless, there are positive signs of recovery. Since 2009 (the nadir of the Great Recession), exports for the whole UK ceramics industry have grown by 5%. In the district's most synonymous sector - Table and Giftware - exports have risen by 30% over the same period (UK Trade Info, 2014)[19]. Moreover, gross value added product - a proxy for profitability - across this sub-sector rose from £125 million (in 2009) to £165 million (in 2012) at basic prices (ONS; 2013).

Actors play the major role in shaping district trajectories and in assessing the recent revival of the district, our qualitative research points towards *purposive adaptation* by leading firms and institutions to the phase of the 'long decline', the 'shake out' from the Great Recession, and the new opportunities in the global market. Table (1) summarises the key drivers identified (from our study) as facilitating recent change within the district. In short, it is the co-ordination of micro (firm led) and meso (district led) strategies that have begun to facilitate a *'shifting of the tide'* within North Staffordshire. At the micro level, the major drivers are the leading district firms who have purposively adapted to exogenous change by building upon the district's existing strengths and focusing upon higher value added activities, either via upgrading existing products and/or diversifying into related sectors. This has encouraged new entry in the traditional table and giftware, and also in new sectors offering potential through geo-polymerisation of ceramics technologies. Some firms have undertaken investment in new facilities, equipment, design, marketing, and personnel, to exploit these new opportunities. At the meso (district) level, technological gatekeepers have become prominent conduits for

advance in energy efficiency and in new (and related) fields. The degree of technological heterogeneity has begun to widen again within the district, offering the district the prospect of an industrial renaissance (Menzel and Fornahl, 2010).

In addition, there has been a concerted effort by both district institutions and firms to re-invigorate networks (and more diffuse modes of governance) and also to promote collective action over issues of mutual interest. It was apparent this emerging collaboration has acted as a catalyst for the district's recent revival; it has facilitated greater bench-marking of production activities, information and knowledge exchange, co-ordinated marketing, and joint actions. Moreover, as identified in previously commissioned consultancy reports, poor governance (and a lack of inter-firm collaboration) within the district was a conspicuous feature of the 'long decline'. The previous (long standing) lack of co-ordination, particularly over district and industry wide issues, was a significant barrier to growth and is likely to have inhibited an earlier recovery in the district's fortunes (see North Staffordshire Taskforce, 2003). The emergence of a more collaborative framework is likely to bode the district well in adapting to future challenges.

Insert Table 1 Here

Finally, we should note while a clear view (across interviewees) was the district had begun to *turn the tide*, it was also evident for a number of firms - across the whole sector – that this *rising tide has not yet begun to lift all boats.* This was particularly the case for district firms largely operating at the lower end of the market, where cost pressures have been more acute and trading conditions have continued to be '*tough going*', with '*business a daily struggle'*. These firms have been unable to exploit the new terms of trade and/or move into higher product categories, largely due to a lack of available finance (and/or unwillingness to take on additional risks) to invest in the new technologies and the dynamic capability required to compete in the higher value added markets. The district has long accommodated these types of firm; Rowley (1998) once crudely classified them as 'survivalists'. This is not unusual - all clusters comprise of firms with heterogeneous capabilities in terms of absorbing and exploiting new knowledge, technologies and opportunities (Ter Wal and Boschma, 2011); this in itself sustains employment (and skills) and is a sign of resilience, even if the firms' long-term position is relatively weak.

Concluding Comments and Limitations

In 2007, Stoke–on-Trent's award winning Potteries Museum and Art Gallery proudly unveiled a mosaic of several hundred fragments of china – known locally as 'shard' and which had in many cases been unearthed from local grounds (having previously been buried as waste) – carrying the many different back-stamps of past (and some current) North Staffordshire producers[20]. The accompanying text outlined the district's rich history, but added a rather sombre outlook that the disappearance of many of these back-stamps reflected the UK industry's (terminal) decline, grimly noting ceramics manufacture was now destined for China (and the Far East). Six years on and such a dismal outlook no longer looks so prescient. While significant challenges remain on the horizon, there appears a renewed vigour within the district, a feeling the tide has begun to turn in its favour and of a possible renaissance. The case does, however, demonstrate there is nothing inevitable about the trajectory of old industrial districts, even those that appear to be in 'locked in' to a 'terminal decline'. Through *purposive adaptation* and joint actions, local actors can help to steer such districts onto new trajectories (Martin, 2010).

Finally, we add a caveat in the generalisation of key findings from case study research. This is especially so with the North Staffordshire case, since it is far too early to undertake a full evaluation of the district's new trajectory. Nevertheless, our case highlights some encouraging early signs for old (and declining) industrial districts (or clusters). In particular, the strategies adopted by actors within the North Staffordshire district, suggest that *purposive adaptation* can open up new trajectories and (terminal) decline is not inevitable. Such a prospect may suggest a greater role for appropriate regional and industrial policies to initiate strategies and facilitate adaptation among local actors, to rejuvenate districts at this stage of the cycle (Brenner and Schlump, 2011). It is beyond the scope of this paper to deliberate further upon the exact nature such policies may entail, although others have done so (Bailey and Chapain, 2011). Nevertheless, the North Staffordshire case demonstrates it is misguided to abandon (declining) districts on the basis that they have little left to offer. Indeed, this may saddle old districts with unfortunate perceptions and an unwanted stigma which (combined with poor policy choices) can exacerbate decline (see Feyer et.al's (2007) discussion on the declining desirability of the US Rust belt). Rather, as Martin (2010, p.16) has pointed out, a (long-term) shrinkage (decline) in a district's capacity does not mean that it stops evolving (or moving forward); the firms that remain are '*precisely those that are more innovative and competitive [in the global economy]'*. Such firms, along with local institutions and other actors, may be the catalyst for a district's (or region's) renaissance.

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Constructs	Firm (micro-level)	District (meso-level)	Notable Developments
Strategic Changes	Leading Firms upgrading products/ moving into higher value added activities Greater focus upon marketing/tailoring products to different markets Some firms diversifying into related fields	Re-discovery of the cachet inherent to products being 'Made in England' New emphasis upon 'material transformation' within the district Ceram led initiatives to exploit synergies between old and new technologies	Notable success of leading firms/Renewed vigour within the district, including re-shoring and new entry Exploiting 'related variety'; geopolymerisation of ceramics technologies into new product areas Potential possibilities to develop local energy sector
Investment and Technology	Significant New investment in plant and equipment by leading firms Smaller firm investments in more flexible kilns, high tech robotics, print and decal technologies	Ceram investments in new kiln-testing technologies Longton 'Hothouse'	More flexible and cost efficient technologies Improvements in quality and production efficiency (i.e. fewer defects) Wider 'technological heterogeneity' within the district
Governance and networks	Increasing prevalence of professional managers with external experience outside the industry Greater use of factory exchanges/bench-marking within the district Greater collaboration along the supply chain	Action on Consultancy reports to re-invigorate networks NSCC playing a greater role in nurturing networks Urban Network for Innovation in Ceramic Cities (UNIC)	More openness to collaboration and exchange of ideas between firms, facilitating cross-fertilisation Greater cross-links with other European Ceramics cities Improved logistics in supply
Collective Action	Closer engagement between firms, and also between firms and industry institutions, over issues of mutual concern	Greater co-ordination between BCC, NSCC, Ceram, ICTa, the City Council and other institutions over industry issues Establishment of new industry bodies with specific purpose (e.g. Ceramic Development Group, Concept Collective)	Ceramics Skills Academy/New training and skills courses Agreement over new independently validated 'back-stamp' for wholly English produced wares Joint Action over achieving energy efficiency, climate change levies, and security of energy supply British Ceramics Biennial More joint funding bids

Table (1). Purposive Adaptation: Recent Drivers of Endogenous Change within the North Staffordshire District (Source: Interview data and published documents)

[1] Some of the main frameworks and salient issues are explored in this Journal's Special Issue on the 'The Resilient Region' (Vol 3, No 1, 2010) and the Special Issue of Regional Studies (Vol 45, No 10, 2011) entitled 'Cluster Life Cycles'.

[2] Swann and Prevezer (1996) highlight how US and UK software firms typically established themselves in declining clusters of computer hardware manufacture to take advantage of redundant engineers and expertise. Asheim et.al (2011, p.895) also note how several new and distinct industries emerged – post 1945 -within Emilia-Romagna, which originated from its wide knowledge base in engineering.

[3] Martin and Sunley (2011; p.1310) do not accept a decline in heterogeneity (during the life cycle (which precipitates 'lock in')) as inevitable; this may not occur if cluster firms can exploit their wider open innovation networks (which often span outside the cluster's boundaries).

[4] 'Heterarchical' relations are pluralistic with 'flat' or 'diffuse' governance structures, with firms recognising their mutual interdependencies and engaging in mutually re-enforcing activities (Sacchetti and Sugden, 2003).

[5] On designing appropriate local governance and institutional structures for effective local and regional development, see the discussion in Hildreth and Bailey (2013).

[6] Noteworthy brand names include Aynsley (est. 1775), Minton (1793), Wedgwood (1759), Spode (1780) and Royal Doulton (1815). Estimates on number of firms provided by Keynote (2003).

[7] These now include the British Ceramic Confederation (BCC), CERAM Research, Ceramic Skills Academy, the International Clay Technology Association (ICTa) and the recently formed Ceramic Development Group. The trade union, Ceramic and Allied Trade Union (CATU) re-structured and was renamed UNITY in 2006, with membership widened to include non (and displaced) ceramics workers.

[8] At the onset of the 'Great Recession', ceramics firms were faced with difficult decisions between retaining skills and the need to reduce employment costs. An industry view was a balance was achieved, due to the proactive and conciliatory positions taken by trade unions and firms especially with regards to working arrangements. It is beyond the scope of this paper to consider this issue of changing industrial relations, although we note similar observations have been recorded in other industries (Bailey and Chaplain, 2011)).

[9] While utilising qualitative techniques from case research, our approach largely involved exploring the interview data in the context of a priori theory (relating to 'cluster upgrading'), rather than using case material to build grounded theory (Yin, 2014).

[10] Similarly Steelite, actively markets its hotel-ware products on the basis of their high quality (see http://www.peach-report.com/Marketing/630040/steelite_takes_bus_to_emphasise_durability.html)

[11] Emma Bridgewater Ltd, for instance, deliberately eschew new technology and greater mechanisation, since a unique feature of their table and giftware product is it is handmade using traditional skills (such as sponge and hand decorating) with materials sourced locally. The company employs over 200 workers and is currently recruiting (see *Progressive Gifts & Home Worldwide*, 2013).

[12] It may also be noted that several supply chain companies within the district are now foreign owned, which in itself may raise governance issues (see Sacchetti and Tomlinson, 2009).

[13] Energy efficiency is a major issue for UK ceramics firms, both in terms of its relative cost (to rivals producing elsewhere) and the reliability of supply. Ceramics is an energy intensive industry, requiring high temperature firings of clay products which makes it vulnerable to interruptions in supply (thus halting production and risking

damage to kilns); the UK's relatively low gas storage capacity and declining margins in electricity generation capacity has already resulted in the industry being given notice of potential energy shortages and disruptions in periods of adverse weather.

[14] In early 2014, Ceram was renamed Lucid-eon to reflect its wider material testing activities across a range of industries.

[15] For instance, it was noted that until the late 1980s, it was not uncommon to still observe intra-firm competition within the district, with some factories (under the same ownership) outbidding each other over new contracts.

[16] Discussions are currently focused upon exploring course structures and the potential for bespoke courses for the industry. The local universities are also involved with Staffordshire University having recently instigated a Technical Ceramics Board, while ICTa initiated (and funded) a foundation degree/higher apprenticeship (distance learning) which is run in conjunction with Derby University, which has experience of delivering courses for quarrying, asphalt, concrete and related sectors.

[17] The NSCC has the UKTI contract for exporting for Staffordshire and plays an important role in helping ceramics firms in export markets. This includes export advice, organising small workshops on exporting and assisting firms in attending international trade fairs. The NSCC is currently exploring the possibility of establishing a 'trading house' with the City Council.

[18] For further details see, http://urbact.eu/en/projects/innovation-creativity/unic/homepage/.

[19] While encouraging, it is unlikely the trade balance will move into surplus in the near future due to district capacity constraints and the focus of the remaining district firms primarily geared towards higher value added 'niche' markets, rather than low cost mass produced wares.

[20] See http://www.emmabiggsmosaic.net/06_mie.html